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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/886,781	06/21/2001	Seth Miller	TI-31007	6130

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EXAMINER
JOLLEY, KIRSTEN

ART UNIT	PAPER NUMBER
1762	4

DATE MAILED: 03/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/666,781	MILLER ET AL.	
	Examiner	Art Unit	
	Kirsten Crockford Jolley	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-42 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-42 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3
4)☐ Interview Summary (PTO-413) Paper No(s). _____
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: .

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: On pages 9, 11, and 14 of the specification, the acronym "PGMEA" is used. The acronym should be spelled out before its first use in the specification.

Appropriate correction is required.

Claim Objections

2. Claim 33 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

3. Claims 32 and 35 are objected to because of the following informalities: The acronym "PGMEA" is used in line 2 of each of the claims. The Examiner requests that the acronym be spelled out upon its first use in the claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (US 5,512,374).

As to claims 1, 18-20, and 33, Wallace et al. discloses a method of coating free-standing micromechanical devices by depositing an organic resin containing coating material on the free-standing structures of the micromechanical device, the coating material comprising perfluoropolyether (PFPE) in a solvent (col. 6, lines 31-36). Wallace et al. teaches the viscosities of some of the PFPE coating materials applied onto the micromechanical device in its invention, and the Examiner notes that several of the coating materials have a viscosity of less than 120 centistokes (see the Table in col. 5).

While it is noted that Wallace et al. does not teach the percentage of solids dissolved or dispersed in solvent, Wallace et al. teaches that the solvent or carrier is added in order to obviate damage to the delicate DMD elements which might otherwise be caused by large drops of masses of dense PFPE moving relatively thereto. Therefore, Wallace et al. has shown that the amount of solvent is a cause-effective variable, and it would have been obvious for one skilled in the art to have determined the optimum amount of solvent, and thus the optimum percent solids, through routine experimentation. It is well settled that determination of optimum values of cause effective variables such as this process parameters is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Finally, while Wallace et al. does not specifically teach a curing step, it is the Examiner's position that the evaporation of the solvent from the coating formed on the micromechanical device (which inherently occurs) meets Applicant's limitation of a curing step.

With respect to claims 5-6, 14, and 24-25, Wallace et al. teaches that the PFPE coating material may be deposited on the substrate by spinning, as an alternative to dipping (col. 5, lines 49-54). While Wallace et al. does not specifically teach that the spinning method requires the addition of solvent, like the dipping method, it is the Examiner's position that the liquid film forming process of spinning would similarly be subject to damage of the delicate DMD elements. Therefore it would have been obvious for one having ordinary skill in the art to have added solvent to the PFPE coating solution in a spinning method, for the same reasons discussed above.

It is noted that Wallace et al. lacks a specific teaching of the spin speeds used in a spin coating process of applying a PFPE coating. It is well known in the spin coating art that the spin speed needed for uniform coating is dependent upon the desired thickness, characteristics of the coating solution (such as viscosity) and the coating environment (temperature, humidity), etc. It would have been obvious for one skilled in the art to have determined the optimum spin speed for spin coating through routine experimentation in the absence of a showing of criticality since it is well settled that determination of optimum values of cause effective variables such as these process parameters is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

With respect to claims 2, 11, and 21, it is acknowledged that Wallace et al. does not teach a specific viscosity of 118 centistokes. However, Wallace et al. teaches viscosities closely above and below 118 cs, and additionally it is noted that the addition of solvent would affect the viscosity. As discussed above, it is the Examiner's position that it would have been obvious to

have optimized the amount of solvent added, and thus the viscosity, through routine experimentation.

As to claims 3, 12, and 22, Wallace et al. does not teach adding a surfactant. The Examiner notes that it is well known in the coating art to add surfactants to coating materials in order to change the surface properties of a coating or to increase wetting. It would have been obvious for one having ordinary skill in the art to have added a surfactant to the coating of Wallace et al. with the expectation of improved wetting since such is well known in the coating art.

As to claims 4, 13, and 23, Wallace et al. teaches that the coating solution is deposited with a sufficient thickness to ensure its chemical stability and to cover the structures (col. 6, line 55 to col. 7).

With respect to claims 7-9, 15-17, and 26-28, it is noted that Wallace et al. lacks a teaching of heating the PFPE coating after its application. The Examiner notes that it is well known in the coating art to apply heat to a coating in order to accelerate the evaporation of a solvent contained therein. In the case that a solvent is added to Wallace et al.'s PFPE coating, as taught for dipping, it is the Examiner's position that it would have been obvious to one having ordinary skill in the art to have heated the substrate after coating in order to speed the evaporation of the solvent from the deposited coating. Further, it would have been obvious for one skilled in the art to have determined the optimum heating temperature through routine experimentation depending upon the amount of solvent that needs to be added to the coating, the thickness of the coating, and the length of time of heating. After heating is completed, the temperature would inherently be lowered back to room temperature.

6. Claims 29-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. as applied to claims 1-28 above, and further in view of Redd et al. (US 6,391,800).

As to claims 29,34, and 36-37, Wallace et al. is applied for the reasons set forth in the paragraph above. Wallace et al. lacks a teaching of depositing a solvent layer on the micromechanical device prior to applying the PFPE coating material. Redd et al. is cited for its teaching of the conventionality of coating a substrate with a thin, solvent layer prior to coating with a thicker photoresist layer in order to spread the photoresist layer more easily and to obtain a more uniform photoresist coating (col. 1, lines 41-53). It would have been obvious to one having ordinary skill in the art, upon seeing the teachings of Redd et al., to have similarly spin coated a coating of solvent only, prior to spin coating the PFPE layer, with the expectation of improving the ease of coating and uniformity of the PFPE layer in the process of Wallace et al. As to claims 38-39, it is noted that excess coating material is thrown off the substrate in spin coating processes.

As to claims 32 and 35, Wallace et al. lacks a teaching of exemplary solvents that may be used in its coating process. One skilled in the art would have been motivated to look to the prior art of spin coating processes to determine solvents that are commonly used. Redd et al. teaches the use of PGMEA as a solvent that is applied prior to the photoresist coating layer for prewetting the substrate (col. 3, lines 7-20). It would have been obvious to one skilled in the art to have used PGMEA as the prewetting and dissolving/dispersing solvent in the method of Wallace et al. since Redd et al. teaches that PGMEA is a known wetting solvent.

Claims 30-31, 40-42 are rejected for the reasons discussed above in paragraph 5.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art of Beebe et al. (US 6,248,668), Hurditch et al. (US 6,391,523), and Yagi et al. (US 6,020,215) are cited to demonstrate the state of the prior art related to the instant invention.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten Crockford Jolley whose telephone number is 703-306-5461. The examiner can normally be reached on Monday to Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on 703-308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193.

kcj
March 21, 2003